

CLAIMS

What is claimed is:

1. An electronic element, comprising a deposited film containing cesium, said deposited film comprising a plurality of projections composed of cesium oxide on a surface thereof.

2. An electronic element according to claim 1, wherein said deposited film comprises an amorphous film of carbon, and said projections are conical and have an average height h in a range of $10 \text{ nm} \leq h \leq 500 \text{ nm}$.

3. An electronic element according to claim 2, wherein said amorphous film of carbon is formed by an ion beam deposition process using a negative ion beam.

4. An electronic element according to claim 2, wherein said amorphous film of carbon is a cold cathode element which emits electrons when an electric field is applied to said cold cathode element.

5. An electronic element according to claim 3, wherein said amorphous film of carbon is a cold cathode element which emits electrons when an electric field is applied to said cold cathode element.

6. An electronic element, comprising a main body that is formed of an amorphous film of carbon and that contains a metal element having a metal bond radius equal to or larger than two times the atom radius of carbon, and a surface layer that covers said main body and that is formed of an amorphous film of carbon having a high sp^3 hybridization.

7. An electronic element according to claim 6, wherein in said surface layer, a half-value width Hw of a photoelectron spectrum of C_{1s} electrons by an X-ray photoelectron spectroscopic analysis is equal to or smaller than 2.0 eV.

8. An electronic element according to claim 6, wherein said main body has, on an interface thereof to said surface layer, a plurality of projections containing said metal element, and said surface layer has a plurality of protrusions formed to conform to said projections.

9. An electronic element according to claim 7, wherein said main body has, on an interface thereof to said surface layer, a plurality of

projections containing said metal element, and said surface layer has a plurality of protrusions formed to conform to said projections.

10. An electronic element according to claim 8, wherein said metal element is cesium or rubidium.

11. An electronic element according to claim 9, wherein said metal element is cesium or rubidium.

12. An electronic element according to claim 10, wherein each of said main body and said surface layer is formed by an ion beam deposition process.

13. An electronic element according to claim 11, wherein each of said main body and said surface layer is formed by an ion beam deposition process.

14. An electronic element according to claim 12, wherein said electronic element is used as a cold cathode element that emits electrons with application of an electric field to said cold cathode element.

15. An electronic element according to claim 13, wherein said electronic element is used as a cold cathode element that emits electrons with application of an electric field to said cold cathode element.

16. An electronic element comprising a main body composed of an amorphous film of carbon, and a surface layer that covers said main body and that is formed of an amorphous film of carbon having a high sp^3 hybridization.

17. An electronic element according to claim 16, wherein said electronic element is used as a cold cathode element that emits electrons with application of an electric field to said cold cathode element.

18. An electronic element according to claim 10, wherein said metal element is cesium contained in a range of from 0.1% by atom to 5.0% by atom in the amorphous film of carbon.

19. An electronic element according to claim 11, wherein said metal element is cesium contained in a range of from 0.1% by atom to 5.0% by atom in the amorphous film of carbon.